

CLAIMS

Claims 1 through 57 (canceled)

58. (previously presented) A vacuum filtration apparatus comprising:

a base containing a funnel well with a filter seal surface integral to said base, disposed adjacent to the bottom of the inside wall of said funnel well, with a filter support means integral to said base, disposed in the bottom of said funnel well inside of said filter seal surface, with an outlet port integral to said base disposed below said filter support means, said outlet port being in direct fluid flow communication with said filter support means,

a funnel with an open top, said funnel containing an integral flexible filter seal, with at least a portion of said integral flexible filter seal disposed below the bottom surface of the outside wall of the funnel, said integral flexible filter seal being compressible in the vertical direction,

a filter means disposed in the bottom portion of said funnel well with the outer periphery of the downstream surface of said filter means lying in the same plane as the integral filter seal surface of said base,

with the bottom portion of said funnel releasably attached to said base, with the integral flexible filter seal of the funnel inserted into the funnel well of the base a sufficient distance to compress the integral flexible filter seal of the funnel in the vertical direction, thereby releasably sealing the outer periphery of the filter means with a leak tight seal between the integral filter seal surface of the base and the bottom surface of the compressed integral flexible filter seal of the funnel, said releasable

seal allowing the filter means to be removed from the apparatus after first removing the funnel,

whereby the integral flexible filter seal of the funnel can be compressed a sufficient distance in the vertical direction to releasably seal filter means of varying thickness', with a leak tight seal between said integral filter seal surface of said base and the bottom surface of said integral flexible seal of said funnel.

59. (canceled)

60. (previously presented) The vacuum filtration apparatus of claim 58 wherein the top surface of the integral filter support means of the base is disposed within, and below, the integral filter seal surface of the base, thereby creating a pad well below the integral filter seal surface of the base, and wherein an absorbent pad is disposed in said pad well, with the downstream surface of said absorbent pad resting directly on the top surface of the integral filter support means, with a portion of the downstream surface of the filter means resting on the upstream surface of said absorbent pad.

61. (previously presented) The vacuum filtration apparatus of claim 60 wherein said filter means is hydrophilic, and wherein said absorbent pad is hydrophilic, and wherein the filter means has a sufficiently small pore size to remove bacteria from the liquid being filtered, and to trap the bacteria on the upstream surface of the filter means.

62. (previously presented) The vacuum filtration apparatus of claim 61 wherein the thickness of said hydrophilic absorbent pad is sufficiently greater than the height of said pad well, and wherein the thickness of the

hydrophilic absorbent pad is sufficiently greater than the thickness of the hydrophilic filter means,

so that the top of the hydrophilic absorbent pad will swell a sufficient distance above the top of the pad well to keep the hydrophilic filter means wrinkle free after both the hydrophilic filter means and the hydrophilic absorbent pad have been wetted by the liquid being filtered.

63. (previously presented) The vacuum filtration apparatus of claim 58 wherein a portion of the filter means that is in contact with said integral filter seal surface of said base, is further sealed to said integral filter seal surface with a non-releasable seal, said non-releasable seal forming a closed loop.

64. (previously presented) The vacuum filtration apparatus of claim 58 wherein the top portion of said funnel is substantially cylindrical in shape,

with said funnel containing one or more lid clamp tabs protruding from the upper substantially cylindrical portion of the outside wall of said funnel, with the one or more lid clamp tabs containing a sloped surface that tapers outward from the top of the one or more lid clamp tabs to the bottom portion of the one or more lid clamp tabs, so that the minimum diameter of the sloped surface of the one or more lid clamp tabs occurs at the top of the sloped surface of the one or more lid clamp tabs, and so that the maximum diameter of the sloped surface of the one or more lid clamp tabs occurs at the bottom of the sloped surface of the one or more lid clamp tabs,

with said vacuum filtration apparatus further containing a lid, having an outer wall with a substantially cylindrical inner surface with the height of the substantially cylindrical inner surface being greater than the distance between the bottom edge of the sloped surface

of the one or more lid clamp tabs of the funnel and the top wall of the funnel,

with the lid further containing a plurality of slots in the outer wall, with each slot creating a gap in the bottom surface of the outer wall, with the height of the slots being less than or equal to the height of the substantially cylindrical inner surface of the outer wall, with the slots dividing the outer wall into a plurality of segments, thereby allowing the outer wall to flex,

with the diameter of the substantially cylindrical inner surface of the outer wall of the lid being greater than or equal to the diameter of the top outside edge of the funnel, and with the diameter of said substantially cylindrical inner surface of the outer wall of the lid being sufficiently less than the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel when the outer wall of the lid is in its un-flexed state, for all values of the diameter of the substantially cylindrical inner surface of the outer wall of the lid within a normal manufacturing tolerance range around its nominal value, and for all values of the diameter of the top outside edge of the funnel within a normal manufacturing tolerance range around its nominal value, and for all values of the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel within a normal manufacturing tolerance range around its nominal value,

with the number of slots being sufficient to allow the outer wall to flex a sufficient amount when the lid is made from a rigid material, so that the flexing of the outer wall of the lid allows the lid to be easily pressed onto the top of the funnel without the need to rotate the lid with respect to the funnel so that as the bottom inside edge of the substantially cylindrical inner surface of the outer wall of the lid is pushed down onto the sloped surface of the one or more lid clamp tabs, the bottom inside edge of the outer wall will slide over the sloped surface of the one

or more lid clamp tabs until the lid is fully seated onto the funnel with the bottom inside edge of the lid disposed below the bottom of the sloped surface of the one or more lid clamp tabs, thereby causing the segments of the substantially cylindrical inner surface of the outer wall of the lid that contact the one or more lid clamp tabs of the funnel to expand outward and to remain expanded outward for as long as the lid is pressed onto the funnel, thereby releasably attaching the lid to the funnel with an interference fit between the bottom portion of the one or more lid clamp tabs of the funnel and the segments of the inner surface of the outer wall of the lid that contact the bottom portion of the one or more lid clamp tabs, with the interference fit being sufficient to prevent the lid from accidentally disengaging from the funnel, while also allowing the lid to be easily removed from the funnel with one hand by lifting the lid from the funnel without the need to rotate the lid with respect to the funnel, thereby causing the outer wall of the lid to return to its un-expanded state.

65. (previously presented) The vacuum filtration apparatus of claim 64 wherein said base contains one or more lid clamp tabs protruding from the outside wall of said base, with the one or more lid clamp tabs of the base containing a sloped surface that tapers outward from the top of the one or more lid clamp tabs of the base to the bottom portion of the one or more lid clamp tabs of the base, so that the minimum diameter of the sloped surface of the one or more lid clamp tabs of the base occurs at the top of the sloped surface of the one or more lid clamp tabs of the base, and so that the maximum diameter of the sloped surface of the one or more lid clamp tabs of the base occurs at the bottom of the sloped surface of the one or more lid clamp tabs of the base,

with the minimum diameter of the sloped surface of the one or more lid clamp tabs of the base being substantially equal to the minimum diameter of the sloped surface of the one or more lid clamp tabs of the funnel, and with the maximum diameter of the sloped surface of the one or more lid clamp tabs of the base being substantially equal to the maximum diameter of the sloped surface of the one or more lid clamp tabs of the funnel,

so that the flexing of the outer wall of the lid allows the lid to be easily pressed onto the top of the base without the need to rotate the lid with respect to the base so that as the bottom inside edge of the substantially cylindrical inner surface of the outer wall of the lid is pushed down onto the sloped surface of the one or more lid clamp tabs of the base, the bottom inside edge of the outer wall will slide over the sloped surface of the one or more lid clamp tabs of the base until the lid is fully seated onto the base with the bottom inside edge of the lid disposed below the bottom of the sloped surface of the one or more lid clamp tabs of the base, thereby causing the segments of the substantially cylindrical inner surface of the outer wall of the lid that contact the one or more lid clamp tabs of the base to expand outward and to remain expanded outward for as long as the lid is pressed onto the base, thereby releasably attaching the lid to the base with an interference fit between the bottom portion of the one or more lid clamp tabs of the base and the segments of the inner surface of the outer wall of the lid that contact the bottom portion of the one or more lid clamp tabs of the base, with the interference fit being sufficient to prevent the lid from accidentally disengaging from the base, while also allowing the lid to be easily removed from the base with one hand by lifting the lid from the base without the need to rotate the lid with respect to the base, thereby causing the outer wall of the lid to return to its unexpanded state.

66. (previously presented) The vacuum filtration apparatus of claim 64 wherein a means is provided to vent the interior of the funnel when the lid is pressed onto the funnel.

67. (previously presented) The vacuum filtration apparatus of claim 65 wherein a means is provided to vent the interior of the base when the lid is pressed onto the base.

68. (previously presented) The vacuum filtration apparatus of claim 58 wherein the integral flexible filter seal of the funnel is made from a different material than the other parts of the funnel.

69. (previously presented) A vacuum filtration apparatus comprising:

a base containing a funnel well with a filter seal surface integral to said base, disposed adjacent to the bottom of the inside wall of said funnel well, said inside wall being substantially cylindrical in shape, with a filter support means integral to said base, disposed in the bottom of said funnel well inside of said filter seal surface, with an outlet port disposed below said filter support means, said outlet port being in fluid flow communication with said filter support means,

a filter means disposed in the bottom portion of said funnel well with the outer periphery of the downstream surface of said filter means lying in the same plane as said integral filter seal surface,

a funnel with an open top, with one or more integral flexible funnel seal rings protruding from the bottom portion of the outside wall of said funnel above the bottom surface of said funnel,

with the outside diameter of the one or more integral flexible funnel seal rings being sufficiently greater than the inside diameter of the substantially cylindrical inside wall of the funnel well of the base, and with the height of the substantially cylindrical inside wall of the funnel well of the base being sufficiently high, so that the entire bottom portion of the funnel containing the one or more integral flexible funnel seal rings can be pressed into the funnel well of the base until the outer periphery of the filter means is compressed between the bottom surface of the funnel and the integral filter seal surface of the base, with the one or more integral flexible funnel seal rings of the funnel being forced to deflect upward as they are inserted into the funnel well of the base, with the one or more integral flexible funnel seal rings remaining deflected upward for as long as the bottom portion of the funnel containing the one or more integral flexible funnel seal rings is inserted into the base, thereby releasably attaching the funnel to the base with an interference fit between end wall of the upwardly deflected one or more integral flexible funnel seal rings of the funnel and the substantially cylindrical inside wall of the funnel well of the base, with the releasable attachment between the funnel and the base being sufficiently strong to prevent the funnel from being accidentally disengaged from the base, while allowing the funnel to be easily removed from the base by the user,

thereby releasably sealing the filter means to the filtration apparatus with a leak tight seal between the bottom surface of the funnel and the integral filter seal surface of the base for all values of thickness of the filter means greater than zero,

said releasable filter seal allowing the filter means to be removed from the apparatus after first removing the funnel.

70. (previously presented) The vacuum filtration apparatus of claim 69 wherein the outside diameter of the one or more integral flexible funnel seal rings of the funnel are sufficiently greater than the inside diameter of the substantially cylindrical inside wall of the funnel well of the base, so that the funnel can be releasably attached to the base for all values of the outside diameter of the one or more integral flexible funnel seal rings of the funnel within a normal manufacturing tolerance range around its nominal value, and for all values of the inside diameter of the substantially cylindrical inside wall of the funnel well of the base within a normal manufacturing tolerance range around its nominal value.

71. (previously presented) The vacuum filtration apparatus of claim 69 wherein the top surface of the integral filter support means of the base is disposed within, and below, the integral filter seal surface of the base, thereby creating a pad well below the integral filter seal surface of the base, and wherein an absorbent pad is disposed in said pad well, with the downstream surface of said absorbent pad resting directly on the top surface of the integral filter support means, with a portion of the downstream surface of the filter means resting on the upstream surface of said absorbent pad.

72. (previously presented) The vacuum filtration apparatus of claim 71 wherein said filter means is hydrophilic, and wherein said absorbent pad is hydrophilic, and wherein the filter means has a sufficiently small pore size to remove bacteria from the liquid being filtered, and

to trap the bacteria on the upstream surface of the filter means.

73. (previously presented) The vacuum filtration apparatus of claim 72 wherein the thickness of said hydrophilic absorbent pad is sufficiently greater than the height of said pad well, and wherein the thickness of the hydrophilic absorbent pad is sufficiently greater than the thickness of the hydrophilic filter means,

so that the top of the hydrophilic absorbent pad will swell a sufficient distance above the top of the pad well to keep the hydrophilic filter means wrinkle free after both the hydrophilic filter means and the hydrophilic absorbent pad have been wetted by the liquid being filtered.

74. (previously presented) The vacuum filtration apparatus of claim 69 wherein a portion of the filter means that is in contact with said integral filter seal surface of said base, is further sealed to said integral filter seal surface with a non-releasable seal, said non-releasable seal forming a closed loop.

75. (previously presented) The vacuum filtration apparatus of claim 69 wherein the top portion of said funnel is substantially cylindrical in shape,

with said funnel containing one or more lid clamp tabs protruding from the upper substantially cylindrical portion of the outside wall of said funnel, with the one or more lid clamp tabs containing a sloped surface that tapers outward from the top of the one or more lid clamp tabs to the bottom portion of the one or more lid clamp tabs, so that the minimum diameter of the sloped surface of the one or more lid clamp tabs occurs at the top of the sloped surface of the one or more lid clamp tabs, and so that the maximum diameter of the sloped surface of the one or more lid clamp

tabs occurs at the bottom of the sloped surface of the one or more lid clamp tabs,

with said vacuum filtration apparatus further containing a lid, having an outer wall with a substantially cylindrical inner surface with the height of the substantially cylindrical inner surface being greater than the distance between the bottom edge of the sloped surface of the one or more lid clamp tabs of the funnel and the top wall of the funnel,

with the lid further containing a plurality of slots in the outer wall, with each slot creating a gap in the bottom surface of the outer wall, with the height of the slots being less than or equal to the height of the substantially cylindrical inner surface of the outer wall, with the slots dividing the outer wall into a plurality of segments, thereby allowing the outer wall to flex,

with the diameter of the substantially cylindrical inner surface of the outer wall of the lid being greater than or equal to the diameter of the top outside edge of the funnel, and with the diameter of said substantially cylindrical inner surface of the outer wall of the lid being sufficiently less than the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel when the outer wall of the lid is in its un-flexed state, for all values of the diameter of the substantially cylindrical inner surface of the outer wall of the lid within a normal manufacturing tolerance range around its nominal value, and for all values of the diameter of the top outside edge of the funnel within a normal manufacturing tolerance range around its nominal value, and for all values of the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel within a normal manufacturing tolerance range around its nominal value,

with the number of slots being sufficient to allow the outer wall to flex a sufficient amount when the lid is made from a rigid material, so that the flexing of the outer wall

of the lid allows the lid to be easily pressed onto the top of the funnel without the need to rotate the lid with respect to the funnel so that as the bottom inside edge of the substantially cylindrical inner surface of the outer wall of the lid is pushed down onto the sloped surface of the one or more lid clamp tabs, the bottom inside edge of the outer wall will slide over the sloped surface of the one or more lid clamp tabs until the lid is fully seated onto the funnel with the bottom inside edge of the lid disposed below the bottom of the sloped surface of the one or more lid clamp tabs, thereby causing the segments of the substantially cylindrical inner surface of the outer wall of the lid that contact the one or more lid clamp tabs of the funnel to expand outward and to remain expanded outward for as long as the lid is pressed onto the funnel, thereby releasably attaching the lid to the funnel with an interference fit between the bottom portion of the one or more lid clamp tabs of the funnel and the segments of the inner surface of the outer wall of the lid that contact the bottom portion of the one or more lid clamp tabs, with the interference fit being sufficient to prevent the lid from accidentally disengaging from the funnel, while also allowing the lid to be easily removed from the funnel with one hand by lifting the lid from the funnel without the need to rotate the lid with respect to the funnel, thereby causing the outer wall of the lid to return to its un-expanded state.

76. (previously presented) The vacuum filtration apparatus of claim 75 wherein said base contains one or more lid clamp tabs protruding from the outside wall of said base, with the one or more lid clamp tabs of the base containing a sloped surface that tapers outward from the top of the one or more lid clamp tabs of the base to the bottom portion of the one or more lid clamp tabs of the base, so that the minimum diameter of the sloped surface of the one

or more lid clamp tabs of the base occurs at the top of the sloped surface of the one or more lid clamp tabs of the base, and so that the maximum diameter of the sloped surface of the one or more lid clamp tabs of the base occurs at the bottom of the sloped surface of the one or more lid clamp tabs of the base,

with the minimum diameter of the sloped surface of the one or more lid clamp tabs of the base being substantially equal to the minimum diameter of the sloped surface of the one or more lid clamp tabs of the funnel, and with the maximum diameter of the sloped surface of the one or more lid clamp tabs of the base being substantially equal to the maximum diameter of the sloped surface of the one or more lid clamp tabs of the funnel,

so that the flexing of the outer wall of the lid allows the lid to be easily pressed onto the top of the base without the need to rotate the lid with respect to the base so that as the bottom inside edge of the substantially cylindrical inner surface of the outer wall of the lid is pushed down onto the sloped surface of the one or more lid clamp tabs of the base, the bottom inside edge of the outer wall will slide over the sloped surface of the one or more lid clamp tabs of the base until the lid is fully seated onto the base with the bottom inside edge of the lid disposed below the bottom of the sloped surface of the one or more lid clamp tabs of the base, thereby causing the segments of the substantially cylindrical inner surface of the outer wall of the lid that contact the one or more lid clamp tabs of the base to expand outward and to remain expanded outward for as long as the lid is pressed onto the base, thereby releasably attaching the lid to the base with an interference fit between the bottom portion of the one or more lid clamp tabs of the base and the segments of the inner surface of the outer wall of the lid that contact the bottom portion of the one or more lid clamp tabs of the base, with the interference fit being sufficient to prevent

the lid from accidentally disengaging from the base, while also allowing the lid to be easily removed from the base with one hand by lifting the lid from the base without the need to rotate the lid with respect to the base, thereby causing the outer wall of the lid to return to its un-expanded state.

77. (previously presented) The vacuum filtration apparatus of claim 75 wherein a means is provided to vent the interior of the funnel when the lid is pressed onto the funnel.

78. (previously presented) The vacuum filtration apparatus of claim 76 wherein a means is provided to vent the interior of the base when the lid is pressed onto the base.

79. (previously presented) The vacuum filtration apparatus of claim 69 wherein the one or more integral flexible funnel seal rings of the funnel are made from a different material than the other parts of the funnel.

80. (previously presented) A vacuum filtration apparatus comprising:

a base containing a funnel well with a filter seal surface disposed adjacent to the bottom of the inside wall of said funnel well, with an absorbent pad support means disposed in the bottom of said funnel well inside of said filter seal surface, entirely below said filter seal surface, thereby creating a pad well below said filter seal surface, with an outlet port disposed below said absorbent pad support means, said outlet port being in fluid flow communication with said absorbent pad support means,

a funnel with an open top and an open bottom,

a hydrophilic filter means disposed in the bottom portion of said funnel well with the outer periphery of the downstream surface of said filter means lying in the same plane as said filter seal surface, with the outer periphery of the filter means sealed to the filtration apparatus to prevent bypass of un-filtered liquid around the filter means,

with the bottom portion of said funnel releasably attached to said base thereby creating a reservoir for un-filtered liquid above said filter means,

with a hydrophilic absorbent pad disposed in said pad well, with the downstream surface of said hydrophilic absorbent pad resting directly on the top surface of said absorbent pad support means, with at least a portion of the downstream surface of said filter means inside of the filter seal surface resting on the upstream surface of said absorbent pad,

with the thickness of said hydrophilic absorbent pad being sufficiently greater than the height of said pad well, and with the thickness of the hydrophilic absorbent pad being sufficiently greater than the thickness of the hydrophilic filter means,

so that the top of the hydrophilic absorbent pad will swell a sufficient distance above the top of the pad well to keep the hydrophilic filter means wrinkle free after both the hydrophilic filter means and the hydrophilic absorbent pad have been wetted by the liquid being filtered.

81. (previously presented) The vacuum filtration apparatus of claim 80 wherein the filter means is sealed to the filter seal surface of the base with a non-releasable seal, said non-releasable seal forming a closed loop.

82. (previously presented) The vacuum filtration apparatus of claim 81 wherein the non-releasable seal is a heat seal.

83. (previously presented) The vacuum filtration apparatus of claim 81 wherein the non-releasable seal is an ultrasonic seal.

84. (previously presented) The vacuum filtration apparatus of claim 81 wherein the non-releasable seal is a solvent seal.

85. (previously presented) The vacuum filtration apparatus of claim 80 wherein the filter means is releasably sealed with a compression seal between the bottom surface of the funnel and said filter seal surface.

86. (previously presented) The vacuum filtration apparatus of claim 80 wherein the top portion of said funnel is substantially cylindrical in shape,

with said funnel containing one or more lid clamp tabs protruding from the upper substantially cylindrical portion of the outside wall of said funnel, with the one or more lid clamp tabs containing a sloped surface that tapers outward from the top of the one or more lid clamp tabs to the bottom portion of the one or more lid clamp tabs, so that the minimum diameter of the sloped surface of the one or more lid clamp tabs occurs at the top of the sloped surface of the one or more lid clamp tabs, and so that the maximum diameter of the sloped surface of the one or more lid clamp tabs occurs at the bottom of the sloped surface of the one or more lid clamp tabs,

with said vacuum filtration apparatus further containing a lid, having an outer wall with a substantially cylindrical inner surface with the height of the substantially cylindrical inner surface being greater than

the distance between the bottom edge of the sloped surface of the one or more lid clamp tabs of the funnel and the top wall of the funnel,

with the lid further containing a plurality of slots in the outer wall, with each slot creating a gap in the bottom surface of the outer wall, with the height of the slots being less than or equal to the height of the substantially cylindrical inner surface of the outer wall, with the slots dividing the outer wall into a plurality of segments, thereby allowing the outer wall to flex,

with the diameter of the substantially cylindrical inner surface of the outer wall of the lid being greater than or equal to the diameter of the top outside edge of the funnel, and with the diameter of said substantially cylindrical inner surface of the outer wall of the lid being sufficiently less than the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel when the outer wall of the lid is in its un-flexed state, for all values of the diameter of the substantially cylindrical inner surface of the outer wall of the lid within a normal manufacturing tolerance range around its nominal value, and for all values of the diameter of the top outside edge of the funnel within a normal manufacturing tolerance range around its nominal value, and for all values of the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel within a normal manufacturing tolerance range around its nominal value,

with the number of slots being sufficient to allow the outer wall to flex a sufficient amount when the lid is made from a rigid material, so that the flexing of the outer wall of the lid allows the lid to be easily pressed onto the top of the funnel without the need to rotate the lid with respect to the funnel so that as the bottom inside edge of the substantially cylindrical inner surface of the outer wall of the lid is pushed down onto the sloped surface of the one or more lid clamp tabs, the bottom inside edge of

the outer wall will slide over the sloped surface of the one or more lid clamp tabs until the lid is fully seated onto the funnel with the bottom inside edge of the lid disposed below the bottom of the sloped surface of the one or more lid clamp tabs, thereby causing the segments of the substantially cylindrical inner surface of the outer wall of the lid that contact the one or more lid clamp tabs of the funnel to expand outward and to remain expanded outward for as long as the lid is pressed onto the funnel, thereby releasably attaching the lid to the funnel with an interference fit between the bottom portion of the one or more lid clamp tabs of the funnel and the segments of the inner surface of the outer wall of the lid that contact the bottom portion of the one or more lid clamp tabs, with the interference fit being sufficient to prevent the lid from accidentally disengaging from the funnel, while also allowing the lid to be easily removed from the funnel with one hand by lifting the lid from the funnel without the need to rotate the lid with respect to the funnel, thereby causing the outer wall of the lid to return to its un-expanded state.

87. (previously presented) The vacuum filtration apparatus of claim 86 wherein said base contains one or more lid clamp tabs protruding from the outside wall of said base, with the one or more lid clamp tabs of the base containing a sloped surface that tapers outward from the top of the one or more lid clamp tabs of the base to the bottom portion of the one or more lid clamp tabs of the base, so that the minimum diameter of the sloped surface of the one or more lid clamp tabs of the base occurs at the top of the sloped surface of the one or more lid clamp tabs of the base, and so that the maximum diameter of the sloped surface of the one or more lid clamp tabs of the base occurs at the bottom of the sloped surface of the one or more lid clamp tabs of the base,

with the minimum diameter of the sloped surface of the one or more lid clamp tabs of the base being substantially equal to the minimum diameter of the sloped surface of the one or more lid clamp tabs of the funnel, and with the maximum diameter of the sloped surface of the one or more lid clamp tabs of the base being substantially equal to the maximum diameter of the sloped surface of the one or more lid clamp tabs of the funnel,

so that the flexing of the outer wall of the lid allows the lid to be easily pressed onto the top of the base without the need to rotate the lid with respect to the base so that as the bottom inside edge of the substantially cylindrical inner surface of the outer wall of the lid is pushed down onto the sloped surface of the one or more lid clamp tabs of the base, the bottom inside edge of the outer wall will slide over the sloped surface of the one or more lid clamp tabs of the base until the lid is fully seated onto the base with the bottom inside edge of the lid disposed below the bottom of the sloped surface of the one or more lid clamp tabs of the base, thereby causing the segments of the substantially cylindrical inner surface of the outer wall of the lid that contact the one or more lid clamp tabs of the base to expand outward and to remain expanded outward for as long as the lid is pressed onto the base, thereby releasably attaching the lid to the base with an interference fit between the bottom portion of the one or more lid clamp tabs of the base and the segments of the inner surface of the outer wall of the lid that contact the bottom portion of the one or more lid clamp tabs of the base, with the interference fit being sufficient to prevent the lid from accidentally disengaging from the base, while also allowing the lid to be easily removed from the base with one hand by lifting the lid from the base without the need to rotate the lid with respect to the base, thereby causing the outer wall of the lid to return to its unexpanded state.

88. (previously presented) The vacuum filtration apparatus of claim 86 wherein a means is provided to vent the interior of the funnel when the lid is pressed onto the funnel.

89. (previously presented) The vacuum filtration apparatus of claim 87 wherein a means is provided to vent the interior of the base when the lid is pressed onto the base.

90. (previously presented) The vacuum filtration apparatus of claim 88 wherein the means to vent the interior of the funnel when the lid is positioned on the funnel is one or more vent slots in the top of the funnel.

91. (previously presented) The vacuum filtration apparatus of claim 89 wherein the means to vent the interior of the base when the lid is positioned on the base is one or more vent slots in the top of the inside wall of the funnel well of the base.

92. (previously presented) The vacuum filtration apparatus of claim 80 wherein the hydrophilic filter means has a sufficiently small pore size to remove bacteria from the liquid being filtered, and to trap the bacteria on the upstream surface of the filter means.

93. (canceled)

94. (previously presented) The vacuum filtration apparatus of claim 80 wherein the outlet port of the base is directly connectable to a vacuum source.

95. (previously presented) A vacuum filtration apparatus comprising:

a base containing a funnel well with a filter seal surface integral to said base, disposed adjacent to the bottom of the inside wall of said funnel well, with a filter support means integral to said base, disposed in the bottom of said funnel well inside of said filter seal surface, with an outlet port integral to said base disposed below said filter support means, said outlet port being in fluid flow communication with said filter support means,

a filter means disposed in the bottom portion of said funnel well with the outer periphery of the downstream surface of said filter means lying in the same plane as said integral filter seal surface, with the outer periphery of the filter means sealed to said filter seal surface to prevent bypass around the filter means,

a funnel with an open top, with the top portion of the outside wall of the funnel being substantially cylindrical in shape, with the bottom portion of said funnel releasably attached to said base,

with said funnel containing one or more lid clamp tabs protruding from the upper substantially cylindrical portion of the outside wall of said funnel, with the one or more lid clamp tabs containing a sloped surface that tapers outward from the top of the one or more lid clamp tabs to the bottom portion of the one or more lid clamp tabs, so that the minimum diameter of the sloped surface of the one or more lid clamp tabs occurs at the top of the sloped surface of the one or more lid clamp tabs, and so that the maximum diameter of the sloped surface of the one or more lid clamp tabs occurs at the bottom of the sloped surface of the one or more lid clamp tabs,

a lid, having an outer wall with a substantially cylindrical inner surface with the height of the substantially cylindrical inner surface being greater

than the distance between the bottom edge of the sloped surface of the one or more lid clamp tabs of the funnel and the top wall of the funnel,

with the lid further containing a plurality of slots in the outer wall, with each slot creating a gap in the bottom surface of the outer wall, with the height of the slots being less than or equal to the height of the substantially cylindrical inner surface of the outer wall, with the slots dividing the outer wall into a plurality of segments, thereby allowing the outer wall to flex,

with the diameter of the substantially cylindrical inner surface of the outer wall of the lid being greater than or equal to the diameter of the top outside edge of the funnel, and with the diameter of said substantially cylindrical inner surface of the outer wall of the lid being sufficiently less than the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel when the outer wall of the lid is in its un-flexed state, for all values of the diameter of the substantially cylindrical inner surface of the outer wall of the lid within a normal manufacturing tolerance range around its nominal value, and for all values of the diameter of the top outside edge of the funnel within a normal manufacturing tolerance range around its nominal value, and for all values of the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel within a normal manufacturing tolerance range around its nominal value,

with the number of slots being sufficient to allow the outer wall to flex a sufficient amount when the lid is made from a rigid material, so that the flexing of the outer wall of the lid allows the lid to be easily pressed onto the top of the funnel without the need to rotate the lid with respect to the funnel so that as

the bottom inside edge of the substantially cylindrical inner surface of the outer wall of the lid is pushed down onto the sloped surface of the one or more lid clamp tabs, the bottom inside edge of the outer wall will slide over the sloped surface of the one or more lid clamp tabs until the lid is fully seated onto the funnel with the bottom inside edge of the lid disposed below the bottom of the sloped surface of the one or more lid clamp tabs, thereby causing the segments of the substantially cylindrical inner surface of the outer wall of the lid that contact the one or more lid clamp tabs of the funnel to expand outward and to remain expanded outward for as long as the lid is pressed onto the funnel, thereby releasably attaching the lid to the funnel with an interference fit between the bottom portion of the one or more lid clamp tabs of the funnel and the segments of the inner surface of the outer wall of the lid that contact the bottom portion of the one or more lid clamp tabs, with the interference fit being sufficient to prevent the lid from accidentally disengaging from the funnel, while also allowing the lid to be easily removed from the funnel with one hand by lifting the lid from the funnel without the need to rotate the lid with respect to the funnel, thereby causing the outer wall of the lid to return to its un-expanded state,

a means to vent the interior of the funnel when the lid is pressed onto the top of the funnel.

96. (previously presented) The vacuum filtration apparatus of claim 95 wherein the filter means is sealed to the filter seal surface of the base with a non-releasable seal, said non-releasable seal forming a closed loop.

97. (previously presented) The vacuum filtration apparatus of claim 96 wherein the non-releasable seal is a heat seal.

98. (previously presented) The vacuum filtration apparatus of claim 96 wherein the non-releasable seal is an ultrasonic seal.

99. (previously presented) The vacuum filtration apparatus of claim 96 wherein the non-releasable seal is a solvent seal.

100. (previously presented) The vacuum filtration apparatus of claim 95 wherein the filter means is releasably sealed to the base by compressing the outer periphery of the filter means between the bottom edge of the funnel and the filter seal surface of the base.

101. (previously presented) The vacuum filtration apparatus of claim 95 wherein said base contains one or more lid clamp tabs protruding from the outside wall of said base, with the one or more lid clamp tabs of the base containing a sloped surface that tapers outward from the top of the one or more lid clamp tabs of the base to the bottom portion of the one or more lid clamp tabs of the base, so that the minimum diameter of the sloped surface of the one or more lid clamp tabs of the base occurs at the top of the sloped surface of the one or more lid clamp tabs of the base, and so that the maximum diameter of the sloped surface of the one or more lid clamp tabs of the base occurs at the bottom of the sloped surface of the one or more lid clamp tabs of the base,

with the minimum diameter of the sloped surface of the one or more lid clamp tabs of the base being substantially equal to the minimum diameter of the sloped surface of the one or more lid clamp tabs of the funnel, and with the

maximum diameter of the sloped surface of the one or more lid clamp tabs of the base being substantially equal to the maximum diameter of the sloped surface of the one or more lid clamp tabs of the funnel,

so that the flexing of the outer wall of the lid allows the lid to be easily pressed onto the top of the base without the need to rotate the lid with respect to the base so that as the bottom inside edge of the substantially cylindrical inner surface of the outer wall of the lid is pushed down onto the sloped surface of the one or more lid clamp tabs of the base, the bottom inside edge of the outer wall will slide over the sloped surface of the one or more lid clamp tabs of the base until the lid is fully seated onto the base with the bottom inside edge of the lid disposed below the bottom of the sloped surface of the one or more lid clamp tabs of the base, thereby causing the segments of the substantially cylindrical inner surface of the outer wall of the lid that contact the one or more lid clamp tabs of the base to expand outward and to remain expanded outward for as long as the lid is pressed onto the base, thereby releasably attaching the lid to the base with an interference fit between the bottom portion of the one or more lid clamp tabs of the base and the segments of the inner surface of the outer wall of the lid that contact the bottom portion of the one or more lid clamp tabs of the base, with the interference fit being sufficient to prevent the lid from accidentally disengaging from the base, while also allowing the lid to be easily removed from the base with one hand by lifting the lid from the base without the need to rotate the lid with respect to the base, thereby causing the outer wall of the lid to return to its unexpanded state.

102. (previously presented) The vacuum filtration apparatus of claim 101 wherein a means is provided to vent

the interior of the base when the lid is pressed onto the base.

103. (previously presented) The vacuum filtration apparatus of claim 95 wherein the top surface of the integral filter support means of the base is disposed within, and below, the integral filter seal surface of the base, thereby creating a pad well below the integral filter seal surface of the base, and wherein an absorbent pad is disposed in said pad well, with the downstream surface of said absorbent pad resting directly on the top surface of the integral filter support means, with a portion of the downstream surface of the filter means resting on the upstream surface of said absorbent pad.

104. (previously presented) The vacuum filtration apparatus of claim 103 wherein said filter means is hydrophilic, and wherein said absorbent pad is hydrophilic, and wherein the filter means has a sufficiently small pore size to remove bacteria from the liquid being filtered, and to trap the bacteria on the upstream surface of the filter means.

105. (previously presented) The vacuum filtration apparatus of claim 104 wherein the thickness of said hydrophilic absorbent pad is sufficiently greater than the height of said pad well, and wherein the thickness of the hydrophilic absorbent pad is sufficiently greater than the thickness of the hydrophilic filter means,

so that the top of the hydrophilic absorbent pad will swell a sufficient distance above the top of the pad well to keep the hydrophilic filter means wrinkle free after both the hydrophilic filter means and the hydrophilic absorbent pad have been wetted by the liquid being filtered.

106. (previously presented) A vacuum filtration apparatus comprising:

a base containing a funnel well with a first filter seal surface disposed adjacent to the bottom of the inside wall of said funnel well, with a filter support means disposed in the bottom of said funnel well, inside of, and below, said first filter seal surface, thereby creating a pad well inside of, and below, said first filter seal surface, with said filter support means containing a second filter seal surface at its outer periphery, with an outlet port disposed below said filter support means, said outlet port being in fluid flow communication with said filter support means,

a funnel with an open top, with the bottom portion of said funnel releasably attached to said base,

a second filter means disposed in said pad well with the entire downstream surface of the second filter means in contact with said filter support means, and with the downstream portion of the outer periphery of said second filter means in contact with said second filter seal surface,

an absorbent pad disposed in said pad well, with the outer boundary of the absorbent pad disposed entirely within the boundary of the pad well, with the downstream surface of said absorbent pad resting on the upstream surface of said second filter means,

a first filter means disposed in the bottom portion of said funnel well with the outer periphery of the downstream surface of said first filter means lying in the same plane as the plane of said first filter seal surface of said base, with the outer periphery of said first filter means sealed to said base to prevent bypass around said first filter means, with at least a portion of the downstream surface of the first filter

means that lies within the boundary of the pad well resting on the upstream surface of the absorbent pad.

107. (previously presented) The vacuum filtration apparatus of claim 106 wherein the first filter means, and the second filter means, and the absorbent pad are hydrophilic,

and wherein the pore size of the second filter means is less than the pore size of the first filter means,

and wherein the pore size of the absorbent pad is less than the pore size of the first and second filter means.

108. (previously presented) The vacuum filtration apparatus of claim 107 wherein the pore size of the second filter means is sufficiently small to prevent the liquid in the pores of the second filter means from being sucked out of the pores of the second filter means by a vacuum source applied to the outlet port,

after the first filter means, the absorbent pad and the second filter means have been wetted by the liquid being filtered,

and after all of the liquid in the funnel has been sucked out of the funnel by the vacuum applied to the outlet port.

109. (previously presented) The vacuum filtration apparatus of claim 106 wherein the first filter seal surface is an integral part of the base,

and wherein the filter support means is an integral part of the base,

and wherein the outlet is an integral part of the base.

110. (previously presented) The vacuum filtration apparatus of claim 109 wherein the releasable attachment between said funnel and said base is an interference fit

between the outer wall of said funnel, and the inside wall of said funnel well of said base.

111. (previously presented) The vacuum filtration apparatus of claim 108 wherein the thickness of said hydrophilic absorbent pad is sufficiently greater than the height of said pad well, and wherein the thickness of the hydrophilic absorbent pad is sufficiently greater than the thickness of the first hydrophilic filter means,

so that the top of the hydrophilic absorbent pad will swell a sufficient distance above the top of the pad well to keep the first hydrophilic filter means wrinkle free after both the first hydrophilic filter means and the hydrophilic absorbent pad have been wetted by the liquid being filtered.

112. (previously presented) A vacuum filtration apparatus comprising:

a base containing a funnel well with a filter seal surface disposed adjacent to the bottom of the inside wall of said funnel well, with a filter support means disposed in the bottom of said funnel well inside of said filter seal surface, with an outlet port disposed below said filter support means, said outlet port being in fluid flow communication with said filter support means,

a filter means disposed in the bottom portion of said funnel well with the downstream surface of said filter means lying in the same plane as the plane of said filter seal surface,

a filter seal ring comprising an annular ring containing a substantially horizontal top surface, and a substantially horizontal bottom surface, with an inner end surface extending from the inner edge of the top surface to the inner edge of the bottom surface, and with an outer end surface extending from the outer edge of the top surface to the outer edge of the bottom

surface, with the maximum diameter of the outer end surface of the filter seal ring being greater than the inside diameter of the funnel well, the filter seal ring being made from a non-elastomeric material,

with the filter seal ring press fitted into the funnel well, until the outer periphery of the filter means is compression sealed with a leak tight seal between at least a portion of the bottom surface of the filter seal ring and the filter seal surface of the base, with an interference fit formed between at least a portion of the outer end surface of the seal ring and the inside wall of the funnel well,

a funnel with an open top, and an open bottom, with the bottom portion of said funnel releasably attached to the said base, thereby creating a reservoir for un-filtered liquid above the filter means, with the funnel being attached to the base after the filter seal ring has been pressed into the funnel well of the base.

113. (previously presented) The vacuum filtration apparatus of claim 112 wherein the outer periphery of the substantially horizontal top surface of the filter seal ring slopes upward so that the outer edge of the top surface is disposed above the inner edge of the top surface,

and wherein the outer periphery of the substantially horizontal bottom surface of the filter seal ring slopes upward so that the outer edge of the bottom surface is disposed above the inner edge of the bottom surface.

114. (previously presented) The vacuum filtration apparatus of claim 112 wherein the top surface of the filter support means of the base is disposed within, and below, the filter seal surface of the base, thereby creating a pad well below the filter seal surface of the base, and wherein an absorbent pad is disposed in said pad well, with the downstream surface of said absorbent pad resting directly on

the top surface of the filter support means, with a portion of the downstream surface of the filter means resting on the upstream surface of said absorbent pad.

115. (previously presented) A vacuum filtration apparatus comprising:

a base containing an outlet port capable of being adapted to a vacuum source, said base further containing a filter seal surface disposed above said outlet port,

a filter means disposed upstream of the outlet port, with the outer periphery of the downstream surface of the filter means in contact with the filter seal surface of the base,

a filter support means disposed between the filter means and the outlet port, with at least a portion of the downstream side of the filter means disposed inside of said filter seal surface supported by said filter support means,

a funnel with an open top, said funnel containing an integral flexible filter seal, with at least a portion of said integral flexible filter seal disposed below the bottom surface of the outside wall of the funnel, said integral flexible filter seal being compressible in the vertical direction,

with said funnel attached to said base so that the bottom surface of said integral flexible filter seal of the funnel is in contact with the upstream surface of the outer periphery of the filter means, and so that the integral flexible seal of the funnel is compressed in the vertical direction thereby sealing the outer periphery of the filter means with a leak-tight compression seal between the bottom surface of the compressed integral filter seal of the funnel and the filter seal surface of the base, said funnel forming a

reservoir capable of holding un-filtered liquid upstream of said filter means,

whereby the integral flexible filter seal of the funnel can be compressed a sufficient distance in the vertical direction to seal filter means of varying thickness', with a leak tight seal between the filter seal surface of the base and the bottom surface of the integral flexible seal of the funnel.

116. (previously presented) The vacuum filtration apparatus of claim 115 wherein the flexible filter seal of the funnel is made from a different material than the other parts of the funnel.

117. (previously presented) The vacuum filtration apparatus of claim 115 wherein the attachment between the funnel and the base is a releasable attachment, thereby allowing the filter means to be removed from the apparatus, after first removing the funnel from the base.

118. (previously presented) The vacuum filtration apparatus of claim 115 wherein the base further contains a pad well, with the side wall of the pad well disposed entirely inside of the filter seal surface of the base, and with the bottom wall of the pad well disposed entirely below the filter seal surface of the base, with an absorbent pad disposed in said pad well, with the entire downstream surface of the absorbent pad resting on the bottom surface of the pad well, thereby making the bottom surface of the pad well a pad support means, with at least a portion of the downstream surface of the filter means disposed inside of the filter seal surface of the base resting on the upstream surface of the absorbent pad, thereby making the upstream surface of the absorbent pad the filter support means.

119. (previously presented) A vacuum filtration apparatus comprising:

a base containing an outlet port capable of being adapted to a vacuum source,

a funnel with an open top attached to the base,

a filter support means disposed upstream of the outlet port,

a filter means disposed upstream of the filter support means, said filter means being sealed to the vacuum filtration apparatus, thereby preventing un-filtered liquid from bypassing the filter means, thereby preventing the flow of un-filtered liquid through the outlet port,

with the interior of the funnel capable of holding un-filtered liquid upstream of said filter means,

with said funnel containing one or more lid clamp tabs protruding from the upper portion of the outside wall of said funnel, with the one or more lid clamp tabs containing a sloped surface that tapers outward from the top of the one or more lid clamp tabs to the bottom portion of the one or more lid clamp tabs, so that the minimum diameter of the sloped surface of the one or more lid clamp tabs occurs at the top of the sloped surface of the one or more lid clamp tabs, and so that the maximum diameter of the sloped surface of the one or more lid clamp tabs occurs at the bottom of the sloped surface of the one or more lid clamp tabs,

with said vacuum filtration apparatus further containing a lid having an outer wall with a substantially cylindrical inner surface with the height of the substantially cylindrical inner surface being greater than the distance between the bottom edge of the sloped surface of the one or more lid clamp tabs of the funnel and the top wall of the funnel,

with the lid further containing a plurality of slots in the outer wall, with each slot creating a gap in the bottom surface of the outer wall, with the height of the slots being less than or equal to the height of the substantially

cylindrical inner surface of the outer wall, with the slots dividing the outer wall into a plurality of segments, thereby allowing the outer wall to flex,

with the diameter of the substantially cylindrical inner surface of the outer wall of the lid being greater than or equal to the diameter of the top outside edge of the funnel, and with the diameter of said substantially cylindrical inner surface of the outer wall of the lid being sufficiently less than the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel when the outer wall of the lid is in its un-flexed state, for all values of the diameter of the substantially cylindrical inner surface of the outer wall of the lid within a normal manufacturing tolerance range around its nominal value, and for all values of the diameter of the top outside edge of the funnel within a normal manufacturing tolerance range around its nominal value, and for all values of the maximum outside diameter of the sloped surface of the one or more lid clamp tabs of the funnel within a normal manufacturing tolerance range around its nominal value,

with the number of slots being sufficient to allow the outer wall to flex a sufficient amount when the lid is made from a rigid material, so that the flexing of the outer wall of the lid allows the lid to be easily pressed onto the top of the funnel without the need to rotate the lid with respect to the funnel so that as the bottom inside edge of the substantially cylindrical inner surface of the outer wall of the lid is pushed down onto the sloped surface of the one or more lid clamp tabs, the bottom inside edge of the outer wall will slide over the sloped surface of the one or more lid clamp tabs until the lid is fully seated onto the funnel with the bottom inside edge of the lid disposed below the bottom of the sloped surface of the one or more lid clamp tabs, thereby causing the segments of the substantially cylindrical inner surface of the outer wall of the lid that contact the one or more lid clamp tabs of the

funnel to expand outward and to remain expanded outward for as long as the lid is pressed onto the funnel, thereby releasably attaching the lid to the funnel with an interference fit between the bottom portion of the one or more lid clamp tabs of the funnel and the segments of the inner surface of the outer wall of the lid that contact the bottom portion of the one or more lid clamp tabs, with the interference fit being sufficient to prevent the lid from accidentally disengaging from the funnel, while also allowing the lid to be easily removed from the funnel with one hand by lifting the lid from the funnel without the need to rotate the lid with respect to the funnel, thereby causing the outer wall of the lid to return to its un-expanded state.

120. (previously presented) A vacuum filtration apparatus comprising:

a base containing an outlet port capable of being adapted to a vacuum source, a filter seal surface disposed above said outlet port, and a pad well,

said pad well containing a substantially vertical side wall and a bottom wall, with the boundary of the top of the side wall of the pad well being coincident with the inner boundary of the filter seal surface, with the bottom surface of the pad well being substantially parallel to the filter seal surface, and disposed entirely below the filter seal surface,

a hydrophilic absorbent pad disposed in said pad well, with the downstream surface of said hydrophilic absorbent pad resting directly on the bottom surface of the pad well,

a hydrophilic filter means, with the downstream surface of the outer periphery of the hydrophilic filter means in direct contact with the filter seal surface of the base, with the outer periphery of the hydrophilic filter means sealed to the vacuum filtration apparatus to prevent the flow of un-filtered liquid between the filter seal surface

of the base and the downstream surface of the outer periphery of the hydrophilic filter means, with at least a portion of the downstream surface of the hydrophilic filter means disposed inside of the filter seal surface of the base resting on the top surface of the hydrophilic absorbent pad,

a funnel with an open top attached to the base, said funnel forming a reservoir capable of holding un-filtered liquid upstream of the hydrophilic filter means,

whereby un-filtered liquid from the funnel, is drawn first through the hydrophilic filter means, and then through the hydrophilic absorbent pad, and then into the outlet port, by applying a vacuum source to the outlet port,

with the thickness of said hydrophilic absorbent pad being sufficiently greater than the height of said pad well, and with the thickness of the hydrophilic absorbent pad being sufficiently greater than the thickness of the hydrophilic filter means,

so that the top of the hydrophilic absorbent pad will swell a sufficient distance above the top of the pad well to keep the hydrophilic filter means wrinkle free after both the hydrophilic filter means and the hydrophilic absorbent pad have been wetted by the liquid being filtered.

121. (previously presented) The vacuum filtration apparatus of claim 120 wherein the bottom wall of the pad well further contains a pad underdrain, said pad underdrain directing the flow of filtered liquid from the absorbent pad to the outlet port, thereby reducing the pressure drop across the hydrophilic absorbent pad.

Very respectfully,

  
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